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Effects of attention on postural sway after ACL injury

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Introduction

The amount of variability in a system can be indicative of its health and function. Entropy, a nonlinear measure that quantifies the regularity of variability, has been used to distinguish postural sway differences in neurological disorders. More regular variation in gait is found in those with an ACL injury compared to those without. Many things may influence postural control including where the mind is focused during a task. Focusing on something outside the body (externally focused) made performance on a balance task more automatic, whereas focusing on the body (internally focused) induced less automatic control. We tested the influence of attentional focus on variability of postural sway post ACL injury. Automatic control is associated with less cognition (not having to think about something as much) and more optimal/skilled performance. The purpose of this study was to document the influence of attentional focus on non-linear aspects of postural sway post ACL injury.

Methods

There were 43 subjects, 22.84 ± 3.64 years old, with 23 in the non-injured group and 20 in the ACL injury group. Participants were tested on 4 focus conditions:

- No focus
- Focus on keeping the injured knee still
- Focus on keeping the uninjured knee still
- Focus externally on keeping a laser still in a small target on the wall

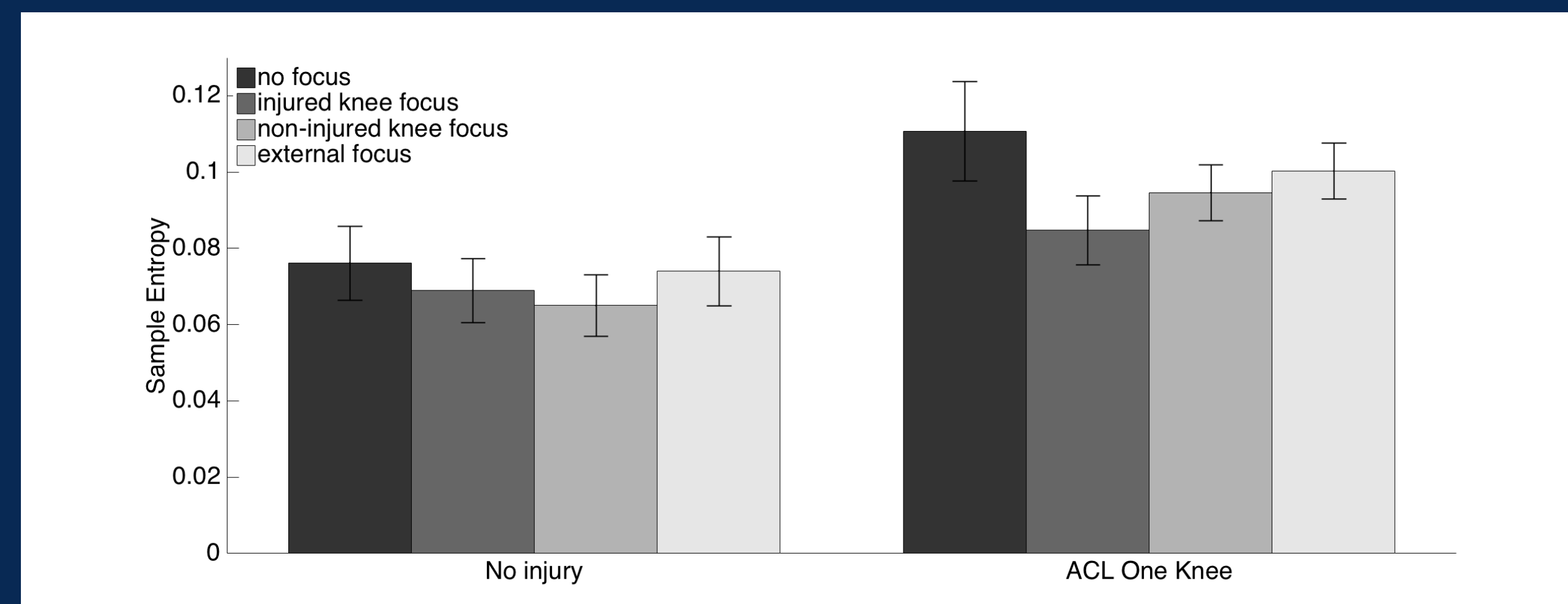
Results

Those in the ACL group had significantly more irregular sway than the non-injured group for anterior-posterior sway ($p = .01$) and average displacement ($p < .0001$). The ACL group, but not the no-injury group, had significantly more irregular average displacement during the external focus task vs. the internal focus tasks ($p = 0003$).

Figure 1 – Graphs Depicting Level of Regularity

Front to Back Movement

A significant difference was found between the groups ($p = .01$). The ACL group had greater irregularity overall compared to the non-injured group.



Average Displacement

The most interesting finding was that the ACL group was significantly more irregular during the external focus task compared to the internal focus tasks which was not seen in the non-injured group.

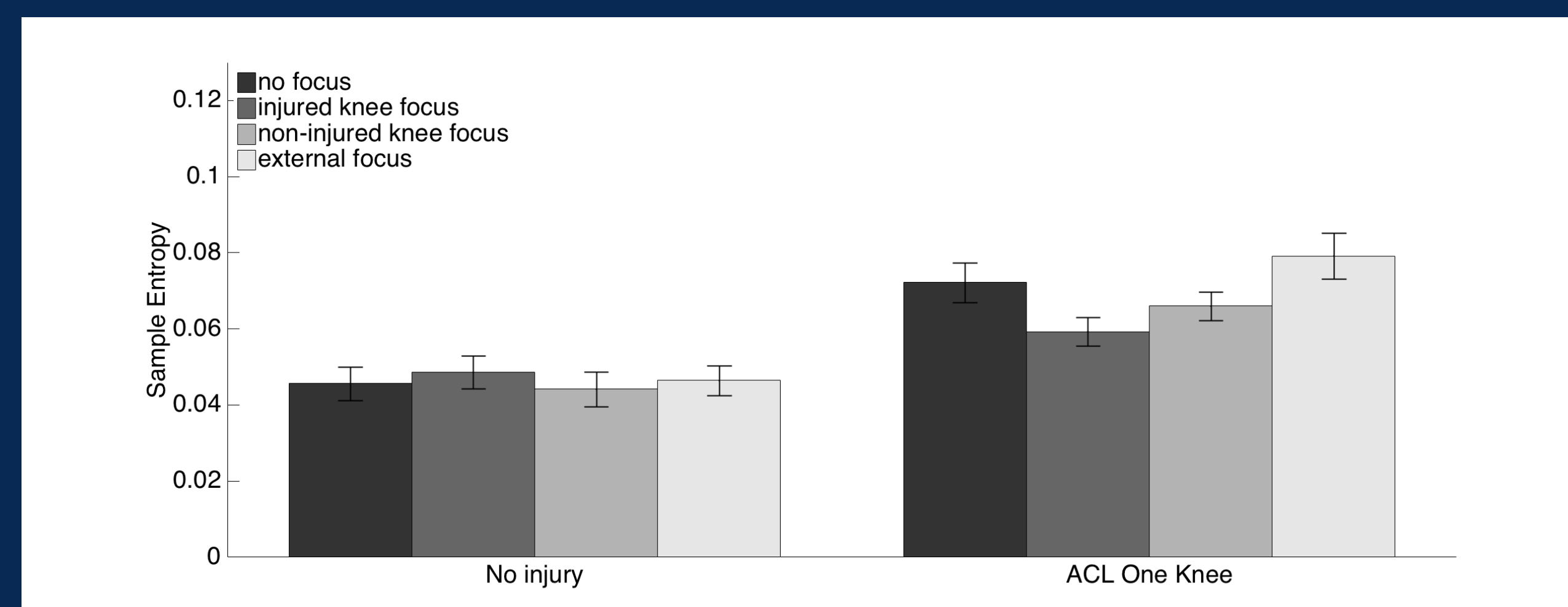


Figure 2 – Set-up of experiment



Conclusions

The results show that attention does have an effect on postural sway after an ACL injury. This effect comes into play when comparing internal focus and external focus for the injury group. This means that while focusing externally, the ACL group was more irregular which, based on previous research, indicates more automaticity, which is optimal for postural stability. More testing should be done to see if attentional focus can improve dynamic movement (like walking), which could augment rehabilitation.

